Overview of Operating Support Systems Applications
(Continued)

LEO

The Local Exchange Ordering (LEO) database and control system consists of three main components: an IMS-DC application running on a mainframe using a DB2 database, a service order monitoring application running on an HP UNIX server, and an IMS on-line work management system running on the same mainframe as the database application.

Orders arriving from the EDI gateway and translator are placed into the database and control system using a remote IMS transaction triggered by the placement of the file by the translator. These transactions load the data into the database, check the data for basic validity, and pass it to the service order generator (LESOG) if the order can be handled. This software is coded in COBOL II.

The service order monitoring application receives copies of the service order when its status changes in the Service Order Control System (SOCS). The application transmits pertinent information to the LEO database and control system using a proprietary file transfer system that has persistent delivery and verifies the data transmitted. The files are batch transmitted every thirty minutes. A confirmation file is transmitted back to the monitoring application upon receipt of the data. Failure to receive the confirmation before the next transmission causes alarms. This application is written in C and runs on a HP T520. It is monitored using Tivoli.

When the database and control system receives appropriate statuses from the monitoring system, it generates confirmations of firm orders, jeopardy notices, and completion notifications. The order is placed into the work management system in the following situations: the order is in an error status; it could not be routed to the service order generator; or the generator system detected an error while processing the order. This includes a set of prioritized queues from which service representatives retrieve work. It updates the database so the control system can track the work. This software is coded in COBOL II.

LESOG

The Local Exchange Service Order Generator converts the service request into a BST internal service order and places it into SOCS. It receives its input from the LEO database and control system through BST's Navigator. This action starts the processing of the order. It communicates with operating support systems to obtain data needed for the order generation. This communication is by TaskMate terminal emulation programs. Any errors are transmitted to the LEO database and control system via BST Navigator. This application runs on two HP T520 systems monitored by Tivoli.

Other Pre-Ordering Systems

RNS

The Regional Negotiation System (RNS) provides BST with a means to perform pre-ordering inquiries in all states in BST's region. RNS is a client/server Graphical User Interface (GUI) application which includes most pre-ordering and ordering functionality needed by BST representatives. RNS was intended to replace both DOE and SONGS negotiation systems, but accounts for roughly 90% of usage by BST representatives, while DOE and SONGS account for the remaining 10%.

DOE

The Direct Order Entry (DOE) system provides BST with a means to perform pre-ordering inquiries in the states of North Carolina, South Carolina, Georgia, and Florida. DOE is a legacy mainframe application which requires BST representatives to have intimate knowledge of special internal codes in order to perform pre-ordering and ordering functionality.

SONGS

The Service Order Negotiation System (SONGS) provides BST with a means to perform pre-ordering inquiries in the states of Kentucky, Tennessee, Alabama, Mississippi, and Louisiana. SONGS is a legacy mainframe application which requires BST representatives to have intimate knowledge of special internal codes in order to perform pre-ordering and ordering functionality.

RSAG

The Regional Street Address Guide (RSAG) legacy mainframe database system stores street address information used to validate customer addresses.

COFFI

The Central Office Features File Interface (COFFI) system stores information about product and service offerings and availability. Like PSIMS, COFFI enables LENS to provide CLECs with information regarding products and services available in a customer's local area.

ATLAS

The Application for Telephone Number Load Administration and Selection (ATLAS) enables LENS to provide CLECs with the ability to select and reserve telephone numbers from a pool of available telephone numbers.

BOCRIS/HAL

LENS uses the Hands-off Assignment Logic (HAL) system to access the Business Office Customer Record Information System (BOCRIS). HAL is an application that allows BST servers, including LENS, access to legacy systems. BOCRIS is the front-end system for CRIS used by BST representatives across the region. See the full description of CRIS under the "Billing Systems" section of this document.

DSAP

The DOE Support Application (DSAP) enables LENS to provide CLECs with due date calculations for orders.

PSIMS

The Product/Services Inventory Management System (PSIMS) stores information about product and service offerings and availability. Like COFFI, PSIMS enables LENS to provide CLECs with information regarding products and services available in a customer's local area.

Other Ordering Systems

RNS

See the full description of RNS under the "Other Pre-Ordering Systems" section of this document.

DOE

See the full description of DOE under the "Other Pre-Ordering Systems" section of this document.

SONGS

See the full description of SONGS under the "Other Pre-Ordering Systems" section of this document.

SOCS

The Service Order Control System (SOCS) receives service orders from systems such as LESOG, RNS, DOE, or SONGS, and routes the service orders to their appropriate downstream provisioning and billing systems. SOCS, and systems that further process SOCS orders, treat LESOG service orders the same as service orders from internal BST systems.

EXACT

The Exchange Access Control & Tracking (EXACT) system enables InterLATA carriers to submit Access Service Requests (ASRs). EXACT now supports functionality enabling CLECs to submit local interconnection ASRs.

Billing Systems

The following systems are used by BST to generate billing information for CLECs, including customer usage data:

CRIS

The Customer Record Information System (CRIS) is a legacy mainframe database which stores customer information and billing information for each customer. Daily usage data for each customer is captured by local machines and rolled up to CRIS daily.

CABS

The Carrier Access Billing System (CABS) is a legacy mainframe database which stores interexchange carrier (IXC) information and the billing information associated with access services provided to IXCs. Daily usage data for each customer is captured by local machines and rolled up to CABS daily.

ODUF/ADUF

Other Local Exchange Carriers (OLECs), also known as CLECs, can obtain detailed information about individual customers' service usage on a daily basis by receiving the Daily Usage Files (DUFs). CLECs can receive these DUFs using the OLEC Daily Usage File (ODUF) system, which gathers DUF data from CRIS, and/or the Access Daily Usage File (ADUF) system, which generates information about unbundled ports.

Maintenance Systems

BST and CLECs use the following separate systems to handle maintenance issues and submit trouble reports:

BellSouth Business TAFI

The Trouble Analysis Facilitation Interface (TAFI) system used by the Small Business Customer Organization Unit (COU) provides Business Repair Center (BRC) representatives with the ability to analyze customer network problems, make some repairs while on the phone with the customer, and submit trouble reports for others. Trouble reports are submitted to LMOS from this TAFI.

BellSouth Residence TAFI

The TAFI system used by the Consumer COU provides Residential Repair Center (RRC) representatives with the ability to analyze customer network problems, make some repairs while on the phone with the customer, and submit trouble reports for others. Trouble reports are submitted to LMOS from this TAFI.

CLEC TAFI

The CLEC TAFI system provides CLECs with the ability to analyze customer network problems, make some repairs while on the phone with the customer, and submit trouble reports for others. Trouble reports are submitted to LMOS from TAFI.

CLEC TAFI uses identical source code to the combined Residence and Business TAFI systems used by BST. The only functionality difference pertains to the additional log-in step CLECs must use to verify their identity. This step ensures that CLECs will have access only to their customers' records, and not to any other CLEC's customers.

LMOS

The Loop Maintenance Operations System (LMOS) stores telephone number assignment and selected account information. LMOS is used to manage information regarding the dispatching of service orders and trouble reports to outside forces.

WFA-C

Work Force Administration-Control (WFA-C) is a BST Operating Support System of Bellcore design. WFA-C is used by the Control Office in the coordination, testing, turn-up, and repair functions associated with designed services.

Overview of Volume Testing

Forecast of Projected Volumes

BST estimated future volumes based on straight line projections of past volumes. Projected orders were calculated by reviewing order statistics from the Service Order Control System (SOCS) for the months of September, October, and November, 1997. The trend during that time period showed a 20% per month increase in volume. December order volume is forecasted at a 20% increase over November, and January is another increase of 20% etc. Based on the 20% volume average growth trend, management determined that the relevant planning point for volume test capacity was November, 1998 which has an estimated volume of approximately 10, 500 orders per day. Since orders received through LENS and EDI require different processing, it was necessary to estimate the LENS/EDI mix of orders. The test plan was developed with an 80% EDI and 20% LENS order mix because it was anticipated that large CLECs would be entering their orders via EDI.

Environment and Test Design

BellSouth Telecommunications (BST), with the assistance of Bellcore, a New Jersey-based research and development firm, worked jointly to develop a test environment designed to emulate the Local Exchange Ordering and Pre-ordering Gateway and develop a plan to test the gateway's capacity over a 20-hour period.

The systems that comprise the gateway include Electronic Data Interchange(EDI), the Local Exchange Navigation System (LENS), Electronic Commerce Lite (EC-LITE), the Local Exchange Ordering Database (LEO), and the Local Exchange Service Order Generator (LESOG.)

BST, with the assistance of Bellcore, developed a set of test data and created volume simulators to input orders and pre-order inquiries into the test environment. The test data included a mix of EDI orders, LENS orders, and LENS pre-order inquiry transactions. Order types included switch orders, add orders, and disconnect orders.

Overview of Volume Testing
(Continued)

BST produced a volume of EDI orders by holding 20 batches of test orders (400 orders per batch) on the Harbinger Value Added Network. (VAN). The VAN interfaced with the EDI translator (a TSO IMS processor) located at BST's data center located in Birmingham. This translator, also used in the production environment, converts orders from an X.12 format to flat-files usable by LEO and converts Firm Order Confirmations (FOCs) and Completion Notices from flat-files back to an X.12 format required for transmission back to the CLECs across the VAN.

Bellcore produced a volume of LENS orders and pre-order inquiry transactions by running scripts (batches of commands) on a series of test computers which used the HyperText Transmission Protocol (HTTP) to access LENS test servers on BST's Intranet using a LAN-to-LAN connection.

BST used a cluster of 4 LENS servers (SUN E5000's) located in Atlanta and Charlotte to process test transactions. One LENS server was configured as a front-end interface while the other three were configured as back-end transaction processors. In the production environment, additional capacity of up to 15 servers is available for LENS processing in the event additional capacity is needed.

Pre-order inquiry transactions queried databases on BST's legacy systems to obtain addresses, telephone numbers, due date availability, feature/service availability, and customer service records. Where feasible, production databases on BST's legacy systems located in Birmingham were copied to a test environment on an IBM mainframe in Atlanta. These databases included ATLAS, DSAP, RSAG, SOCS and static tables from COFFI. Production databases too large to copy to the test environment were directly accessed by the test transactions. These included BOCRIS, the monthly extract from P/SIMS , and dynamic tables in COFFI (see Other Information for detailed descriptions of legacy systems.)

Although EC-LITE is a component of the Local Exchange Ordering and Pre-ordering Gateway, volume testing was not performed using EC-LITE as the volume test was designed prior to implementation of EC-LITE in production.

The mainframe components of the production LEO system were copied to a test environment on the IBM mainframe in Atlanta. The UNIX component of LEO was copied onto a HP T520 UNIX server. The LEO system performed edits of test data prior to transfer to LESOG. LEO interfaced the LENS cluster and the EDI translator to LESOG processors.

Overview of Volume Testing
(Continued)

Two HP T520 UNIX processors were configured in the test environment to serve as the LESOG cluster. One of these servers was also used for the UNIX component of LEO. Orders were transmitted from LEO to the LESOG cluster. LESOG then converted LSRs into a format usable by BST's internal Service Order Control System (SOCS). Service order status information and error notices are transmitted from SOCS to LEO.

Since test orders were never intended to be provisioned, a simulated volume of completion notices were processed from SOCS.

LEO and LESOG files captured a count of all orders processed and recorded the beginning and end times of the volume test period.

Monitoring

- Members of the testing team monitored server usage statistics and server transaction logs to ensure that transactions were properly flowing through the systems. Processing problems were resolved as they would be in the production environment.

Test Results

- The volume test was conducted during the 20-hour test period that began at approximately 4:00 am on January 15, 1998.
- The Local Exchange Ordering and Pre-ordering Gateway system processed over 11,000 orders in the 20-hour test period.
- 8,000 test orders were processed through EDI. The EDI test data consisted of 20 batches of 400 transactions, each batch consisting of 22% add orders, 25% switch with change orders, 50% switch as is orders and 3% disconnect orders.
- Over 3,000 test orders were processed through LENS. LENS supported 300 concurrent users during the test. Over 50,000 pre-order inquiry transactions were processed simultaneously with the test orders.
- A simulated volume of completion notices was processed during the test.